of 1keV and the count rate can be in the order of a few tens of thousands of cps. When a scintillation counter is used, the resolution is poor at a few keV, but a counter rate of a few hundred thousand cps is possible.

A8 Concld

IN THE CLAIMS:

Please amend claims 1-4 as follows:

A9

1. (Amended) An X-ray fluorescence film thickness measuring device comprising:

an X-ray generating system having a high-voltage power source and an X-ray tube for irradiating primary X-rays;

focusing means for focusing primary X-rays irradiated from the X-ray generating system onto microscopic measurement regions in a sample using a slit unit, a collimator, or a capillary unit utilizing a total reflection phenomenon;

a sample observation optical system for observing the sample during focusing of the primary X-rays for use in positioning of the microscopic measurement regions relative to the primary X-rays;

a system having a liquid nitrogen-less PIN diode X-ray detector or a silicon drift chamber used as a first sensor with low counting efficiency but high energy resolution for detecting X-ray fluorescence generated from the sample,

and a proportional counter, CdZnTe detector, or a scintillation counter as a second sensor having low energy resolution but high counting efficiency compared to the first sensor, the first and second sensors being arranged side-by-side in a sample chamber that is open to the atmosphere and not evacuated, and the system being divided between the first and second sensors according to energy of X-ray fluorescence by utilizing the first sensor for X-ray fluorescence from low energy and utilizing the second sensor for X-ray fluorescence from high energy;

A9 Cont.

a pair of pre-amplifiers each for receiving a signal from a respective one of the first and second sensors;

a pair of linear amplifiers each for receiving a signal from a respective one of the pre-amplifiers;

a pair of frequency analyzers each for analyzing a frequency signal from a respective one of the linear amplifiers; and

common control and computing sections for quantitatively processing signals from the frequency analyzers.

2. (Amended) An X-ray fluorescence film thickness measuring device comprising:

an X-ray generating system having a high-voltage power source and an X-ray tube for irradiating primary X-rays;

focusing means for focusing primary X-rays irradiated from the X-ray generating system onto microscopic measurement regions in a sample using a slit unit, a collimator, or a capillary unit utilizing a total reflection phenomenon;

Ag cont.

a sample observation optical system for observing the sample during focusing of the primary X-rays for use in positioning of the microscopic measurement regions relative to the primary X-rays;

a system having a liquid nitrogen-less PIN diode X-ray detector or a silicon drift chamber used as a first sensor with low counting efficiency but high energy resolution for detecting X-ray fluorescence generated from the sample, and a proportional counter, CdZnTe detector, or a scintillation counter as a second sensor having low energy resolution but high counting efficiency compared to the first sensor, the first and second sensors being arranged side-by-side in a sample chamber that is open to the atmosphere and not evacuated, and the system being divided between the first and second sensors according to energy of X-ray fluorescence by utilizing the first sensor for X-ray fluorescence from low energy and utilizing the second sensor for X-ray fluorescence from high energy;

a pair of pre-amplifiers each for amplifying a signal from respective ones of the first and second sensors;

a single digital circuit for amplifying and analyzing frequencies of signals from the pre-amplifiers; and

common control and computing sections for quantitatively processing signals from the single digital circuit.

A9 cont.

3. (Amended) A fluorescent X-ray film thickness measuring device comprising:

an X-ray generating system having a high-voltage power source and an X-ray tube for generating and emitting primary X-rays;

focusing means including a first collimator block for focusing the primary X-rays onto microscopic measurement regions in a sample and a second collimator block disposed above the first collimator block for receiving primary X-rays from the X-ray generating system and irradiating the primary X-rays toward the first collimator block;

a sample observation optical system for observing the sample during focusing of the primary X-rays for use in positioning of the microscopic measurement regions relative to the primary X-rays;

a detector for detecting X-ray fluorescence generated from the sample;

a pre-amplifier for amplifying a signal from the detector;

a linear amplifier for amplifying a signal from the pre-amplifier; and

a frequency analyzer for analyzing a frequency of a signal from the linear amplifier.

A9 concld

4. (Amended) A fluorescent X-ray film thickness measuring device according to claim 3; wherein the first collimator block comprises a half mirror section and a collimator section located at a side surface of the half mirror section, and the second collimator block comprises a plurality of collimator units located in order along a lateral direction, the first collimator block and the second collimator block being movable in a direction generally perpendicular to an optical axis of the primary X-rays; and further comprising an arbitrary collimator section or half mirror section disposed at a position along an optical axis of the first and second collimator blocks.

Kindly add the following new claims 5-26:

A10

5. An X-ray fluorescence film thickness measuring device comprising:

an X-ray generating system for generating and irradiating primary X-rays;

focusing means for focusing primary X-rays irradiated from the X-ray generating system onto microscopic measurement regions in a sample;

a sample observation optical system for observing the sample during focusing of the primary X-rays for use in positioning of the microscopic measurement regions relative to the primary X-rays;

A10 cont

a first sensor with low counting efficiency but high energy resolution for detecting X-ray fluorescence generated from the sample;

a second sensor having low energy resolution but high counting efficiency compared to the first sensor; and

a pair of pre-amplifiers each for receiving a signal from a respective one of the first and second sensors.

6. An X-ray fluorescence film thickness measuring device according to claim 5; wherein the focusing means comprises a slit unit.

7. An X-ray fluorescence film thickness measuring device according to claim 5; wherein the focusing means comprises a collimator.

8. An X-ray fluorescence film thickness measuring device according to claim 5; wherein the focusing means comprises a capillary unit utilizing a total reflection phenomenon.

9. An X-ray fluorescence film thickness measuring device according to claim 5; wherein the first sensor comprises a liquid nitrogen-less PIN diode X-ray detector.

10. An X-ray fluorescence film thickness measuring device according to claim 5; wherein the first sensor comprises a silicon drift chamber.

A10 cont

11. An X-ray fluorescence film thickness measuring device according to claim 5; wherein the second sensor comprises a proportional counter.

12. An X-ray fluorescence film thickness measuring device according to claim 5; wherein the second sensor comprises a CdZnTe detector.

13. An X-ray fluorescence film thickness measuring device according to claim 5; wherein the second sensor comprises a scintillation counter.

14. An X-ray fluorescence film thickness measuring device according to claim 5; wherein the first and second sensors are arranged side-by-side in a sample chamber that is open to the atmosphere and not evacuated.

15. An X-ray fluorescence film thickness measuring device according to claim 5; further comprising a pair of linear amplifiers each for amplifying a signal from a

respective one of the pre-amplifiers; and a pair of frequency analyzers each for analyzing a frequency of the signal from a respective one of the linear amplifiers.

A10 cont

16. An X-ray fluorescence film thickness measuring device according to claim 15; further comprising common control and computing sections for quantitatively processing signals from the frequency analyzers.

17. An X-ray fluorescence film thickness measuring device according to claim 5; further comprising a digital circuit for amplifying and analyzing frequencies of signals from the pre-amplifiers.

18. An X-ray fluorescence film thickness measuring device according to claim 5; further comprising common control and computing sections for quantitatively processing signals from the single digital circuit.

19. An X-ray fluorescence film thickness measuring device according to claim 5; wherein the focusing means comprises a first collimator block for focusing the primary X-rays onto the microscopic measurement regions and a second collimator block disposed above the first collimator block for receiving primary X-rays from the X-ray generating system and irradiating the primary X-rays toward the first collimator block.

20. An X-ray fluorescence film thickness measuring device according to claim 19; wherein the first collimator block comprises a half mirror section and a collimator section disposed at a side surface of the half mirror section; and wherein the second collimator block comprises a plurality of collimator units, the first collimator block and the second collimator block being movable in a direction generally perpendicular to an optical axis of the primary X-rays.

A10 cont.

21. An X-ray fluorescence film thickness measuring device according to claim 20; further comprising another collimator section or half mirror section disposed at a position along an optical axis of the first and second collimator blocks.

22. A fluorescent X-ray film thickness measuring device comprising:

an X-ray generating system for generating and emitting primary X-rays;

a first collimator block for focusing the primary X-rays onto microscopic measurement regions in a sample;

a second collimator block disposed above the first collimator block for receiving primary X-rays from the X-ray generating system and irradiating the primary X-rays toward the first collimator block;

a sample observation optical system for observing the sample during focusing of the primary X-rays for use in positioning of the microscopic measurement regions relative to the primary X-rays;

A10 cont

a detector for detecting X-ray fluorescence generated from the sample;

a pre-amplifier for amplifying a signal from the detector;

a linear amplifier for amplifying a signal from the pre-amplifier; and

a frequency analyzer for analyzing a frequency of a signal from the linear amplifier.

23. A fluorescent X-ray film thickness measuring device according to claim 22; wherein the first collimator block comprises a half mirror section and a collimator section disposed at a side surface of the half mirror section.

24. A fluorescent X-ray film thickness measuring device according to claim 23; wherein the second collimator block comprises a plurality of collimator units.

25. A fluorescent X-ray film thickness measuring device according to claim 24; further comprising another collimator section or half mirror section disposed at a position along an optical axis of the first and second collimator blocks.

A10 Concl'd

26. A fluorescent X-ray film thickness measuring device according to claim 22; wherein the detector comprises a first sensor with low counting efficiency but high energy resolution for detecting X-ray fluorescence generated from the sample and a second sensor having low energy resolution but high counting efficiency compared to the first sensor.

IN THE ABSTRACT:

Delete the abstract now of record and insert therefor the new abstract submitted herewith on a separate sheet.

IN THE DRAWINGS:

Submitted herewith are copies of Figs. 1, 2 and 5 on which have been marked in red proposed drawing revisions. Upon approval of the drawing revisions and allowance of the application, the formal drawings will be accordingly revised.

ADDITIONAL FEES:

Submitted herewith is a check in the amount of $276.00 to cover the cost of two (2) extra independent claims and six (6) claims in excess of 20 total. Should the check prove insufficient for any reason, authorization is hereby given to charge any such deficiency to our Deposit Account No. 01-0268.